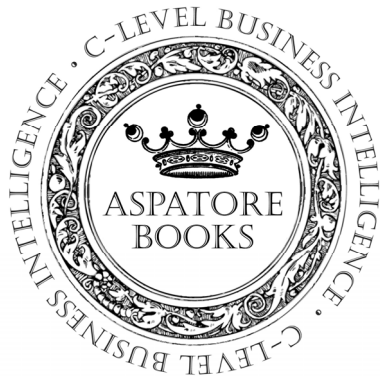


I N S I D E   T H E   M I N D S

# Achieving Success as a CTO

*Leading CTOs on Building IT's Reputation,  
Capitalizing on Employee Strengths, and  
Creating a Productive Environment*



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# The Role of the CTO in a Technology Company

Steve Hart

*Co-Founder and Chief Technical Officer*

ViaSat Inc.



## **Necessary Traits of a CTO**

There are many criteria for being a CTO. The first and most important is a love of technology. I saw my first computer in 1971. It was programmed to play tic-tac-toe and make rude remarks during the game. When I realized that someone had programmed it that way, I fell in love. I wanted to own my own computers and make them jump through hoops of my own devising. My degree is in mathematics, not engineering, and I love working with computers. I feel that computer programming is one of the most elegant and demanding forms of applied mathematics. A love of learning is also necessary for working in this field. I read everything I can get my hands on such as technical books, trade magazines, technical journals, and anything useful on the Internet. I have worked in a wide variety of positions within the technology world, and when I am able to find spare time, I enjoy trying out new tools, programming languages, and environments. A CTO must also possess the ability to think effectively in abstract terms, the ability to deal with ambiguity, and strong leadership and team-building skills since long-term success requires accomplishing far more than one person can do alone.

## **A Successful CTO**

The only true way to measure the success of a CTO is to look at the success of the enterprise. A CTO is successful if he or she effectively supports and enables the business of the company. The way to do that is to understand how technology is going to impact the business. The CTO can measure effectiveness using the same metrics that are used to measure the business. In my case, that is defined as sustained growth while maximizing return on invested capital. It may seem counterintuitive that a CTO would use the same measures of success as that of a CEO, but unless you can understand directly how your technology decisions impact the business, there is no way that you can know that those decisions are the right ones. Of course, the tools that the CTO uses to drive that business success are technical ones. These include technical expertise, technology leadership, and use of information technology for strategic gain.

All CTOs need to have credibility as technology leaders. They must be credible in the eyes of the other corporate leaders, the employees, and the

customers. A CTO must understand how IT drives the company and understand the context of the technology in terms of other technical areas, the customer's needs, the business impact, and the corporate strategy. The challenge is not just to understand these issues, but to be able to communicate them in terms that apply to the interested parties. The most important issue to a development engineer may be quite different from the most important issue to a customer, but each should understand the impact of their issues in the larger context.

## **Evolution of CTO**

The role of CTO has grown to become more of a true C-level executive. In a public company, shareholder value must always be at the forefront of decisions, and the CTO has to understand this in all of its facets. Now, IT must be used to gain strategic advantage for the company, and the role of technology cannot be downplayed. The role will continue to evolve as the line between internal technology and external technology continues to blur. At ViaSat, we are moving more toward development and integration of whole systems, and there is a lot of overlap between what we do for our customers and what we do for our enterprise. I cannot directly influence every project, but I can help identify the strategic value of our technology. If I know that a particular technology will help the company make money and give us an unfair advantage in our market, I will bring that technology to the attention of the executive team. I am as much a chief innovation officer as I am a chief technology officer. I must champion innovative ideas and make sure that our employees are set up to be innovators.

## **CTO Challenges**

There are many challenges that a CTO must face on an almost daily basis. The first is keeping up with technology. The rate of change is fast and accelerating. In order to stay ahead, you have to understand the business in which you operate. When you understand the business and its needs, you are better able to communicate solutions to both the IT team and the business leaders. This can be a difficult area for CTOs as we come from technical backgrounds and frequently have little interest in business management. Credibility is also incredibly important. The people you work

with must value your judgment and leadership. Honesty and integrity are important stepping stones to building credibility.

Another challenge is finding the right balance of breadth versus depth. There will always be more technology than a single person can understand. In some cases more depth is required; for example, understanding the underlying mathematical principles involved in network queuing or data compression. In other cases breadth is more important; for example, understanding the full range of issues involved in creating the proper enterprise architecture. At my organization, we have a very technical leadership team, including two distinct CTO positions. I focus on networking, security, software, and IT. The other CTO, Mark Miller, focuses on communication theory, RF, and hardware. In addition our CEO, Mark Dankberg, is extremely technically proficient and works to drive our technical strategy. While Mark Dankberg is the master of strategic thinking, my expertise is in problem solving. This combination works very well.

Intellectual property is yet another challenge that CTOs face. The world of intellectual properties is dotted with land mines. It is important to watch your step in creating technology. You must create IP that is directly valuable, as well as build a strong portfolio of IP for your own defense.

## **Overcoming Challenges**

The biggest challenge I have faced as a CTO is dealing with growth. This company was created by three people. Our imaginations initially only took us so far; far enough to see how we could become a \$10 million company. Now we earn over \$500 million per year in sales and employ a staff of over 1500, including over 700 engineering and IT people. A primary way that I was able to deal with our growth was through a concerted effort to develop internal leadership. We created a formal “people development” program. This has allowed us to create a team of business and functional leaders who have the capability to carry forward the strong culture of growth, technology leadership, and personal integrity that are the hallmarks of our company.

The integration of acquisitions has been part of our growth. Our approach is not to become a portfolio or holding company, but to gain strategic

advantage through integration. The difficulty lies in the balance of letting the acquired company retain what made it special in the first place while bringing the common cultural and business advantages of being a part of our company. We do this by developing strong working relationships with the leaders of the acquired companies. Personally, I work hard to understand the new technology and to develop a good relationship with the technology leaders of each newly acquired company.

### **Personal Management Style**

I enjoy working with people. I surround myself with very smart people of high integrity. I show interest in them and their needs. In return, I am able to make friends and gather a group of people who are willing to listen to my ideas and take direction when necessary. It isn't necessary to be likeable to lead people, but it certainly helps.

My management style is quite informal. I have spent my entire career trying to avoid being managed and I assume that most technical people don't want to be managed either. I reserve management for business units, projects, and budgets. My leadership approach is to use influence with a team of people to achieve the desired goals. This involves applying the right leadership tool for the situation. You must be able to create a vision, and it is important to set easily understandable goals. You must be able to influence people, which, as a co-worker once memorably stated, "is the ability to let other people have it your way." You must be a good coach in order to help your team succeed. When appropriate, you must delegate. It is important to delegate end goals, not particular tasks: let smart people figure out how to do it themselves. In many cases, the CTO must work outside of the team to make sure obstacles are limited or removed. Finally, ownership is a necessity. The CTO must be willing to make lonely decisions, to admit to mistakes without taking credit for successes, and to deal with the full range of business issues relating to IT, not just the fun technical ones.

### **Working with the Management Team**

As we have grown, we have needed to develop a strong set of business leaders. Our company president and I work closely on the key operational issues. We also have a set of general managers, grown almost exclusively

internally, that I work with to help support the specific business goals. We share technology, people, and methodologies across the business units. I also work very closely with the functional VPs of engineering, IT, finance, operations, and HR. When we were smaller I directly ran both engineering and IT. Now we have executives dedicated to those functions and I work with them to help accomplish all of our technology goals.

### **Working Style of IT**

At ViaSat, technology consists of both engineering, which encompasses product development, and IT, which includes internal projects and support. We have a separate vice president of engineering and vice president of IT with oversight over those functions. The engineering side provides a centralized source for standards, support functions, technology initiatives, and engineering career development. The actual engineering projects are decentralized as each engineer works on projects within their business area. IT, on the other hand, is fully centralized. The management structure is centralized and organized by function. The support functions, service functions, infrastructure, and projects are team-oriented.

### **Working Style of Organization**

During my career, I have experienced pure matrix organizations and pure line organizations and have run into problems with both. We have created a hybrid of the two. We have a central organization that supports collaboration, shared knowledge across the business functions, and process improvements, but we distribute the actual project functions to make sure they address the immediate business goals of each business unit. This eliminates conflict of interest and replaces it with total accountability.

### **Building the Reputation of IT**

It is challenging to build the reputation of IT in an engineering organization. Engineers tend to be the hardest customers to please. In the past we struggled in this area, but have achieved good success in recent years, partly due to bringing in some very strong leadership. Our vice president of IT is not only a strong IT leader, but he also has an engineering background. He has successfully reached out to the business units to

understand their needs and better align IT to support them. In addition, we have continued to upgrade capabilities of the IT staff through a combination of continuing education of existing staff and hiring additional top professionals.

### **Securing Funding**

Our business units are responsible for securing funding for engineering projects and product developments activities. This is through a combination of customer-funded activities and internal R&D funds. For internal projects, we have a standard budget for accomplishing smaller projects. But for any major project, we require a detailed ROI (return on investment) analysis. As a growing profitable company we are able to fund the projects, but it is important to select projects that are of greatest value to the corporation. For example, time to market is a key driver in our profitability, and a project that improves time to market may provide much more value than one that improves the efficiency of a functional team.

### **Managing Technology Teams**

We form teams on a project basis. Each project can have a completely different structure, but all must follow standard processes, including progress tracking and peer reviews. We let the project structure lead the nature of the work. Since teams are temporary, we can move people around as necessary to keep a highly dynamic environment and assist people in their career development. When challenges arise, I may step in to provide an alternative view or bring in additional resources. Sometimes, if a team is finding a problem too difficult, they may be trying to solve the wrong problem.

### **Establishing Goals**

We have formal goals at the top level of each division. The details and specific projects are not established by me as the CTO. Instead they are established by the unit with fiscal responsibility for that project. I try to make sure that the goals are consistent with the corporate and business goals. The projects must never be implemented for departmental gain only, because that hurts the overall mission of the organization.

## **Measuring Success**

Our standard project review process includes major gate reviews and minor subgate reviews, as well as monthly program management reviews, and earned value reporting when appropriate. Success is defined on a project-by-project basis. Before a project begins, success criteria are defined. These criteria are adapted as necessary during the project. For the support teams, success is based on standard metrics compared to industry benchmarks.

## **Capitalizing on Strengths**

We like to set up every employee so that they can succeed in achieving both company goals and their own individual career goals. We work in an extremely demanding environment. Everyone must contribute at a high level and have the capacity to grow either in their work ability or their scope of interest. If issues arise where people's career goals are not consistent with their capabilities, then we have to identify those problems and deal with them. It is a mutual effort to get the most out of the employee and to help the employee get the most out of the company.

## **Creating a Productive Environment**

My goal is to create a positive and productive environment in which I enjoy working, and would have enjoyed working in when I was a software engineer. We try to hire the highest quality people who are also consistent with our corporate culture. We value integrity and we provide whatever tools necessary to get the job done. In this environment, we make sure that everyone understands the vision of the company and their part in achieving that mission. In fact, it is easy to motivate people to do their best if you provide a good work environment in the form of both people and facilities. You must also provide competitive compensation and benefits. Successes must be celebrated and problems must be listened to with your full attention.

These are only a few thoughts about achieving success as a CTO. Total success still requires a bit of luck combined with adaptability to changing conditions, the willingness to admit that you don't know, and the commitment to let other people do things better than you could do them yourself.

*Steve Hart is CTO and co-founder of ViaSat Inc. He provides technical direction across the company in areas of networking, architectures, software technology, and information security. He works with ViaSat's diverse set of business areas to drive innovation and strategic positioning. He also supports business development activities, with technical support in product concept development, customer relations, and proposal activities. Mr. Hart has authored numerous technical papers in satellite networking and computer and communications security, and holds patents for inventions in these areas. He contributed to the growth of ViaSat from three people in 1986 to an international company with over 1500 employees today.*

*Mr. Hart has provided leadership in many of ViaSat's products, helping the growth from individual "black-box" products to fully integrated network communications systems. He led in the development of new satellite networking algorithms and directed the creation of ViaSat's Information Security business.*

*Prior to joining ViaSat, Mr. Hart was a staff engineer and engineering manager at Linkabit Corporation. Prior to that, Mr. Hart worked as a computer security analyst at the Merdan group (both located in San Diego, California) on various projects for the National Security Agency and the Navy. He served U.S. Air Force as an imagery intelligence specialist for four years.*

*Mr. Hart holds a M.A. in mathematics from the University of California, San Diego, and a B.S. in mathematics from the University of Nevada, Las Vegas.*

***Dedication:*** *To my wife, Sue; my partners, Mark Dankberg and Mark Miller; and all of the wonderful employees of ViaSat.*



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